

**WATER QUALITY MONITORING AND RESPONSE PROGRAM**

**TECHALLOY COMPANY FACILITY  
PERRIS, CALIFORNIA**

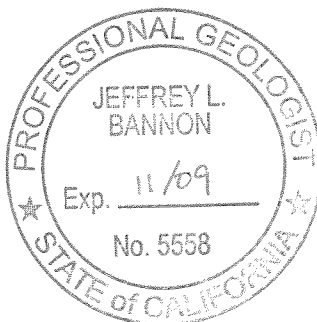
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Prepared for:

**TECHALLOY COMPANY, INC.**  
2500 "A" Street  
Perris, CA 92570

Prepared by:

**WESTON SOLUTIONS, INC.**  
14724 Ventura Boulevard  
Suite 1000  
Sherman Oaks, California 91403



//original signed by//

Jeffrey L. Bannon, RG  
Project Manager

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## **1.0 INTRODUCTION**

The following Water Quality Monitoring and Response Program (WQMRP) details the methods and procedures for water quality monitoring as required under Title 22 of the California Code of Regulations, Chapter 15, Article 6 (hereinafter referred to Article 6). This plan supports the Post-Closure Permit for three (3) closed surface impoundments at the Techalloy Company, Inc. (Techalloy) facility located in Perris, California. This plan replaces an earlier version originally prepared by the Mark Group in April 1992 and modified several times afterward by the Mark Group and Weston Solutions, Inc. (WESTON).

The primary objectives of this WQMRP are:

- Satisfy the water quality requirements under Article 6 for a new Post-Closure Permit application.
- Streamline the water quality sampling plan.
- Create a plan that reflects a change from the former Evaluation Monitoring Program to the current Corrective Action Monitoring Program.

In January 2004, Techalloy requested from the Department of Toxic Substances Control (DTSC) early renewal of the post-closure permit to allow modification to the WQMRP. In response to the request, the DTSC agreed in their June 2004 letter to allow early renewal of the permit. The DTSC further requested a new WQMRP be submitted to reflect the change of the facility from interim to permitted status. The DTSC response also noted that since characterization of the release has been completed and the U.S. Environmental Protection Agency (U.S. EPA) has formally approved a final remedy, groundwater monitoring falls under the category of Corrective Action Monitoring subject to the requirements of CCR Title 22, Chapter 14, Article 6, Section 66264.91(a)(4).

Water quality monitoring under Corrective Action Monitoring provides for reduction in the frequency and type of monitoring not typically allowed under the Detection and Evaluation Monitoring Programs. This WQMRP outlines a monitoring program that reduces the frequency of monitoring from quarterly to semiannually and reduces some of the constituents analyzed to reflect actual site conditions.

## **2.0 BACKGROUND**

The following section provides background information on the facility including site description and site operational and regulatory history.

### **2.1 Site Description**

The Techalloy facility is located at 2500 “A” Street, Perris, California (Figure 1). The facility produces specialty stainless-steel and nickel alloy wire products used by the aerospace and other related industries. The facility occupies approximately seven (7) acres within 20 acres of property owned by Techalloy, and consists of three main buildings (Figure 2). Metal finishing operations are conducted in the western-most building (Wire Cleaning, Figure 2) which is also the location of the current wastewater treatment system. Three closed evaporation ponds are located behind (west) of the wire cleaning building. These ponds were used to collect wastewater from the wire-finishing operations conducted in the adjacent wire cleaning building and are considered the source of impact to groundwater of metals and other general minerals. Further discussion of the history of the ponds is provided in Section 2.2.

Areas to the north, south, and east of the facility are relatively flat, while the area to the west of the facility is hilly (Figures 3 and 4). The facility is located at the outskirts of town and is surrounded by open fields and low hills. The closest development is a residential community located approximately 0.4 miles north (upgradient) of the facility. The open fields surrounding the facility are occasionally farmed for non-irrigated grasses.

In general, the local topography (and groundwater flow) gently slopes south-southeast towards the San Jacinto River located approximately 1,800 feet south of the facility (Figures 3 and 4). The San Jacinto River is the main drainage channel in the area and drains southwestward into Railroad Canyon Reservoir located approximately 2 miles southwest of the facility. The San Jacinto River, as it exists near the Techalloy facility, is a shallow unlined channel that is dry most of the year except during and after significant rainfall typically greatest during the winter months of January to April. Average annual rainfall in the area is approximately 12 inches per year.

### **2.2 Site History**

The Techalloy facility was constructed on vacant property in 1965. From mid-1960’s through 1985, wastewater from metal finishing operations were discharged to one of three evaporation ponds located behind the wire cleaning building (Figure 2). The wastewater included low-pH waste streams containing elevated concentrations of dissolved metals, nitrates, sulfates and other general minerals.

Discharge to Pond 2 and Pond 3 ceased in 1979. Pond 1 continued to receive wastewater until 1985 at which time the current wastewater treatment system was put into operation

and discharge to Pond 1 ceased. Ponds 2 and 3 contained synthetic liners and Pond 1 contained a synthetic liner over concrete base.

### 2.2.1 Pond Closure

In May 1986, Techalloy filed a Closure Plan with the former California Department of Health Services (DHS) to begin the process of closure of the three ponds. The Closure Plan detailed the procedures to be followed for in-place closure of the three ponds, and included details on the engineered cap. The Closure Plan was approved in 1988 and the ponds were closed and capped by July 1989. Certification of pond closure was provided to the DHS in the Report of Closure Installation, Surface Impoundments (Mark Group, August 1989).

As part of the pond closure, sludge material from Ponds 2 and 3 were neutralized on site, excavated and hauled off-site for disposal at an approved off-site facility. Approximately 220, 16-yard loads of neutralized sludge material and visibly impacted soil beneath the liner were removed for off-site disposal. Sludge material in Pond 1 was neutralized on site and remained in Pond 1 on top of the concrete base. The estimated volume of sludge left in Pond 1 is approximately 30,000 cu-ft (1,111 cu-yd).

All three ponds were backfilled with clean soil to required grade level, and covered with an engineered cap. Details of the cap construction are provided in the Closure Plan and included emplacement of a low-permeability clay cap above the backfilled soil, a layer of 60-mil high-density polyethylene (HDPE) sheeting above the clay cap, a geomembrane liner above the HDPE, and soil above the geomembrane to establish ground cover. The entire area is surrounded by a V-ditch to control drainage.

### 2.2.2 Regulatory History and Previous Investigations

Techalloy initiated site investigation activities in 1985, the same year that discharge to the final pond (Pond 1) ceased. A review of regulatory and investigation history is provided below.

- 1985 - First set of monitoring wells installed as part of an initial hydrologic assessment.
- December 1988 - Techalloy entered into a Consent Agreement with the U.S. Environmental Protection Agency (U.S. EPA). Under the agreement, Techalloy was directed to conduct a RCRA Facility Investigation (RFI).
- December 1988 – Ceased use and cleaned waste pile area as required in the Consent Agreement.
- July 1989 – Completed pond closure.
- August 1989 – Filed certification of pond closure.

- 1990-1991 – Conducted RFI.
- October 1991 – RFI approved by U.S. EPA.
- 1992 – California Department of Toxic Substances Control (DTSC) became lead agency for water quality monitoring.
- April 1992 – Submitted Water Quality Monitoring and Response Plan (WQMRP) as part of the Post-Closure Permit Plan.
- August 1993 – Submitted Corrective Measure Study (CMS).
- January 1994 – DTSC approved amended WQMRP. The final approved WQMRP was dated December 1993.
- May 1995 – U.S. EPA issued Final Statement of Basis for corrective measure.
- May 1996 – DTSC approved Post Closure Plan granting closed status for the ponds.
- August 1996 – Submitted Corrective Measures Implementation Plan (CMIP) to U.S. EPA. Plan committed to three years of groundwater extraction followed by project review.
- September 1996 – U.S. EPA approved CMIP. Start date for implementation contingent on approval of modification to existing RCRA Part B permit to allow for treatment of the groundwater.
- October 1997 – DTSC approved modification to Part B permit.
- March 1998 – Completed Initial Stage 1 of corrective measures. Scope of work included conducting pump tests on source area wells and design of the extraction program.
- June 1998 – Began groundwater extraction from two source area wells (MW-1R and MW-3R) at approximately 6,000 gallons per week.
- July 2001 – Submitted initial review of findings from 3-year extraction program to U.S. EPA. Recommended discontinuing groundwater extraction and continued groundwater monitoring.
- November 2001 – U.S. EPA agreed to discontinuation of groundwater extraction at end of 2001, and continuation of monitoring under continued Stage 1 corrective measures. Required submittal of report formalizing findings presented in July 2001.
- January 2002 – Discontinued groundwater extraction.

- March 2002 – Submitted proposed amendment to the WQMRP to the DTSC. Amendment provided justification for reduction in the monitoring program including reduction in monitoring frequency (from quarterly to semiannually), elimination of certain chemical analyses, and reduction in the number of wells sampled.
- April 2002 – Submitted Interim Report on Stage 1 Corrective Measures Implementation to U.S. EPA. Report committed to two additional years of expanded groundwater monitoring under CMI program.
- March 2003 – Submitted supplemental data to support monitoring reduction to the DTSC as requested by DTSC in February 2003.
- January 2004 – Submitted proposal to DTSC for early renewal of Post Closure Permit to allow for re-write of the WQMRP and subsequent reduction in the monitoring program.
- April 2004 – Completed additional two years of monitoring completing CMI program.
- June 2004 – Submitted Final Report, Corrective Measures Implementation to U.S. EPA. Report recommended no additional CMI activities, and continued groundwater monitoring under DTSC oversight to satisfy post-closure monitoring requirements.
- June 2004 – Received letter from DTSC approving request for early renewal of the Post Closure Permit and containing comments on the proposal for monitoring reduction.

### 2.2.3 Regulated Units, Waste Streams and Constituents of Concern

The three (3) former surface impoundments are the regulated units covered under the Post Closure Permit and this WQMRP. The impoundments were closed under DTSC oversight in July 1989 and DTSC approved the Post Closure Plan granting closed status for the ponds in May 1996.

The evaporation ponds collected wastewater from metal finishing operations conducted in the wire cleaning building (Figure 2). The wastewater included low-pH waste streams containing elevated concentrations of dissolved metals, nitrates, sulfates and other general minerals generated during processing of metal alloys. The previous Part B permit listed the following hazardous constituents in the waste streams:

- Copper cyanide
- Hydrochloric acid
- Hydrofluoric acid
- Nickel compounds



- Nitric acid
- Potassium permanganate
- Sodium dichromate
- Sodium hydroxide
- Sulfuric acid
- Zinc compounds

Based on the identified waste streams, the following constituents of concern have been identified as being potentially associated with the regulated units (the closed ponds):

#### Metals

Antimony  
Arsenic  
Barium  
Beryllium  
Boron  
Cadmium  
Chromium  
Chromium (hexavalent)  
Cobalt  
Copper  
Lead  
Manganese  
Mercury  
Molybdenum  
Nickel  
Selenium  
Silver  
Thallium  
Tin  
Titanium  
Vandium  
Zinc

#### Other

Ammonia  
Chloride  
Cyanide  
Fluoride  
Nitrate  
Phosphate  
Sulfate  
Total Dissolved Solids (TDS)

### **3.0 SITE GEOLOGY AND HYDROGEOLOGY**

The subsurface geologic and hydrogeologic conditions at the facility have been explored by a number of borings, monitoring well installations, aquifer tests, and geophysical seismic refraction survey, and are presented in detail in the RFI. In general, the subsurface consists of surficial soil overlying meta-sedimentary bedrock belonging to the Bedford Canyon Formation. The soil layer consists of varying amounts of clay, silt and silty sand. The soil ranges in thickness from non-existent in the low hills west of the facility, to

approximately 5 feet below the facility, and to approximately 20 to 30 feet southward towards the San Jacinto River.

The Bedford Canyon Formation consists of low- to medium-grade metamorphic rocks predominantly composed of argillite slate, schist, quartzite, and meta-limestone. Relict bedding of east-west striking, north-dipping schistosity is mapped in outcrops on the hills immediately west of the facility. Beneath the Techalloy facility, the predominant lithologic formation is biotite schist. The bedrock is slightly to highly weathered. The degree of weathering decreases with depth, but is variable in thickness.

Groundwater beneath the Techalloy facility occurs primarily within the weathered bedrock at a depth of approximately 20 feet below grade. Shallow groundwater occurs primarily in an unconfined condition. Groundwater recharge appears to come mainly from local net percolation within the immediate area, primarily the hills just west of the facility. Depth to groundwater within a well can vary by as much as 8-10 feet between the dry and rainy seasons, particularly during wet years. In general, wells yield very poorly with many pumping dry at less than 1 gallon per minute.

Groundwater flows consistently from northwest to southeast. The groundwater gradient at the site is fairly steep at around 0.008 foot per foot, shallowing further south towards the San Jacinto River. Locations of the current monitoring well network and recent groundwater contours (January 2005) are provided on Figure 5.

Hydraulic conductivity has been calculated from several aquifer tests at around 1.4 to 5 feet/day. Using the January 2005 gradient between MW-21A and MW-24 of 0.0072 ft/ft, an assumed porosity of 0.05, and assumed hydraulic conductivity of 2 feet/day, groundwater flow velocity is calculated as 0.288 feet/day in January 2005.

#### **4.0 NATURE AND EXTENT OF GROUNDWATER PLUMES**

Techalloy has been monitoring groundwater conditions at the site since 1985, including quarterly monitoring since 1989. This monitoring program has created a very large data-set from which to evaluate groundwater conditions. Results of the groundwater investigations and monitoring program show two distinct groundwater plumes associated with the closed ponds. The larger of the two plumes is characterized by the presence of general minerals including sulfate, chlorides, nitrates and total dissolved solids, and extends southward off-site toward the San Jacinto River. The smaller of the two plumes is characterized by low pH and the presence of elevated concentrations of certain metals such as cadmium, chromium, and nickel, in addition to the general minerals. This section reviews the significant findings from the years of monitoring.

##### **4.1 Historical Groundwater Monitoring Results**

The following review of sampling results focuses on the data-set from January 1996 through January 2005. This time period corresponds to the time during which WESTON

has been responsible for data collection and maintaining the data-set, and covers the trends observed over the last nine years of monitoring. Summary tables showing the results of these compounds from January 1996 through January 2005 are provided in Appendix A. Comprehensive historical results for most compounds since monitoring began in 1985 can be found in the annual monitoring reports submitted in November (most recent submitted November 2007).

#### 4.1.1 Metals

The following provides a discussion of historical metals concentrations from January 1996 through January 2005.

##### *Antimony*

Antimony does not appear to be associated with the site, although it was identified as a potential constituent of concern (Section 2.2.2). Except for several anomalous detections in February 1997, antimony has been detected only three times over the last nine years, two detections of which were from the upgradient well MW-21A. The sporadic detection of antimony in February 1997 along with other spurious data from that and the January 1998 sampling event led to a change in the laboratory in July 1998. Sampling is proposed for this analyte every 3 years under this WQMRP.

##### *Arsenic*

Arsenic does not appear to be associated with the site, although it was identified as a potential constituent of concern (Section 2.2.2). Arsenic has been found in all the wells at low concentrations, including the upgradient wells. Concentrations have remained steady and are all below the MCL of 0.05 mg/L. Sampling is proposed for this analyte every 3 years under this WQMRP.

##### *Barium*

Barium does not appear to be associated with the site, although it was identified as a potential constituent of concern (Section 2.2.2). Barium has been detected at low concentrations in all wells. One of the highest concentrations was detected in the upgradient well MW-21A. Concentrations have remained steady and are well below the MCL of 1.0 mg/L. Sampling is proposed for this analyte every 3 years under this WQMRP.

##### *Beryllium*

In general, beryllium is confined to the wells immediately downgradient of the closed ponds at a maximum concentration of 0.039 mg/l. This analyte will continue to be sampled under this WQMRP.

### *Boron*

Boron does not appear to be associated with the site, although it was identified as a potential constituent of concern (Section 2.2.2). Boron is found in all the wells, including the upgradient wells. The highest concentrations are found in the furthest downgradient wells MW-19R and MW-20R. Concentrations have remained steady and no MCL has been established. Sampling is proposed for this analyte every 3 years under this WQMRP.

### *Cadmium*

In general, cadmium is confined to the wells immediately downgradient of the closed ponds at a maximum concentration of 0.15 mg/L. This analyte will continue to be sampled under this WQMRP.

### *Chromium*

In general, chromium is confined to the wells immediately downgradient of the closed ponds at a maximum concentration of 1.1 mg/L, although concentrations have dropped to a maximum of 0.36 mg/L in January 2005. This analyte will continue to be sampled under this WQMRP.

### *Cobalt*

In general, cobalt is confined to near-site wells MW-1R, MW-2R, MW-3R, MW-6R, MW-8B, and MW-14R at low concentrations. An MCL has not been established for cobalt and the concentrations have remained steady in these wells over the last seven years. This analyte will continue to be sampled under this WQMRP.

### *Copper*

In general, copper is confined to the wells immediately downgradient of the closed ponds at a maximum concentration of 70.9 mg/L in January 1996, although concentrations have dropped to a maximum of 13.1 mg/L in January 2005. This analyte will continue to be sampled under this WQMRP.

### *Hexavalent Chromium*

Hexavalent chromium has been detected sporadically in the wells immediately downgradient of the closed ponds. This analyte will continue to be sampled under this WQMRP.

### *Lead*

In general, lead is confined to the wells immediately downgradient of the closed ponds, although lead was detected at low concentrations in all but three wells in January 2005.

Lead has not been detected above the MCL of 0.05 mg/L since October 1998, and has been detected only sporadically since January 2003 at a maximum concentration of 0.027 mg/L. This analyte will continue to be sampled under this WQMRP.

#### *Manganese*

The higher concentrations of manganese are confined to the wells immediately downgradient of the closed ponds at a maximum concentration of 69.7 mg/L in January 1996, although concentrations have dropped to a maximum of 17.1 mg/L in January 2005. Manganese is detected in the upgradient well MW-21B, but at a lower concentration (maximum of 0.78 mg/L). This analyte will continue to be sampled under this WQMRP.

#### *Mercury*

Mercury does not appear to be associated with the site, although it was identified as a potential constituent of concern (Section 2.2.2). Mercury has been detected only sporadically over the last nine years, all below the MCL except for one anomalous detection in downgradient well MW-18R in February 1997. The detection of mercury in February 1997 along with other spurious data from that and the January 1998 sampling event led to a change in the laboratory in July 1998. Sampling is proposed for this analyte every 3 years under this WQMRP.

#### *Molybdenum*

Molybdenum does not appear to be associated with the site, although it was identified as a potential constituent of concern (Section 2.2.2). Molybdenum has been detected in every well at low concentrations, including the upgradient wells. The highest concentrations are found in the furthest downgradient well. Concentrations have remained steady and no MCL has been established. Sampling is proposed for this analyte every 3 years under this WQMRP.

#### *Nickel*

The higher concentrations of nickel are confined to the wells immediately downgradient of the closed ponds at a maximum concentration of 374 mg/L in January 1996, although concentrations have dropped to a maximum of 64.6 mg/L in January 2005. This analyte will continue to be sampled under this WQMRP.

#### *Selenium*

Selenium does not appear to be associated with the site, although it was identified as a potential constituent of concern (Section 2.2.2). Selenium is found in all wells, including the upgradient wells. The highest concentrations are found in the two wells furthest downgradient (MW-19R and MW-20R), at times slightly above the MCL of 0.05 mg/L.

Concentrations in wells immediately downgradient of the closed ponds and other near-site wells have not exceeded the MCL over the last nine years. Sampling is proposed for this analyte every 3 years under this WQMRP.

#### *Silver*

Silver does not appear to be associated with the site, although it was identified as a potential constituent of concern (Section 2.2.2). Silver has been detected sporadically at very low concentrations, well below the secondary MCL of 0.1 mg/L. Sampling is proposed for this analyte every 3 years under this WQMRP.

#### *Thallium*

Thallium does not appear to be associated with the site, although it was identified as a potential constituent of concern (Section 2.2.2). Except for several anomalous detections in February 1997, thallium has been detected only sporadically over the last nine years, all below the MCL of 0.002 mg/L. Sampling is proposed for this analyte every 3 years under this WQMRP.

#### *Tin*

Tin does not appear to be associated with the site, although it was identified as a potential constituent of concern (Section 2.2.2). Except for several anomalous detections in February 1997, tin has not been detected in any well over the last nine years. The sporadic detection of tin in February 1997 along with other spurious data from that and the January 1998 sampling event led to a change in the laboratory in July 1998. Sampling is proposed for this analyte every 3 years under this WQMRP.

#### *Titanium*

Titanium does not appear to be associated with the site, although it was identified as a potential constituent of concern (Section 2.2.2). Only one trace concentration of titanium (0.009J mg/L in MW-14AR in January 2005) has been detected in the last nine years. Sampling is proposed for this analyte every 3 years under this WQMRP.

#### *Vanadium*

Vanadium does not appear to be associated with the site, although it was identified as a potential constituent of concern (Section 2.2.2). Vanadium has been detected sporadically in all wells at similar concentrations, including the upgradient wells. Concentrations have remained steady and no MCL has been established. Sampling is proposed for this analyte every 3 years under this WQMRP.

### *Zinc*

The higher concentrations of zinc are confined to the wells immediately downgradient of the closed ponds at a maximum concentration of 16.2 mg/L in January 1996, although concentrations have dropped to a maximum of 4.0 mg/L in January 2005. This analyte will continue to be sampled under this WQMRP.

#### 4.1.2 General Minerals and Other Non-Metallic Compounds

The following provides a discussion of historical concentrations for general minerals, non-metallic, non-VOC compounds from January 1996 through January 2005.

### *Ammonia*

In general, ammonia is confined to three wells immediately downgradient of the closed ponds (MW-1R, MW-2R and MW-3R) at low concentrations. An MCL has not been established for ammonia and the concentrations have remained steady in these wells over the last nine years. Sampling is proposed for this analyte every 3 years under the WQMRP.

### *Chloride*

Chloride concentrations are highest in the furthest downgradient wells (MW-19R and MW-20R) immediately adjacent to the San Jacinto River. This area is also characterized by high total dissolved solid (TDS) concentrations. This analyte will continue to be sampled under this WQMRP.

### *Cyanide*

Cyanide has been detected sporadically in several wells over the last nine years. Except for the anomalous results from the February 1997 sampling event that led to a change in the laboratory, all detections are well below the MCL of 0.2 mg/L. Sampling is proposed for this analyte every 3 years under this WQMRP.

### *Fluoride*

The higher concentrations of fluoride are confined to the wells immediately downgradient of the closed ponds. This analyte will continue to be sampled under this WQMRP.

### *Nitrate-as-Nitrogen*

The higher concentrations of nitrate-as-nitrogen are found to the wells downgradient of the closed ponds at a maximum concentration of 1,480 mg/L in January 2003, although

concentrations have dropped to a maximum of 431 mg/L in January 2005. This analyte will continue to be sampled under this WQMRP.

#### *Phosphate*

Phosphate does not appear to be associated with the site, although it was identified as a potential constituent of concern (Section 2.2.2). Phosphate has been detected sporadically in all wells at low concentrations, including some of the highest in the concentrations detected in an upgradient well. Concentrations have remained steady and no MCL has been established. Sampling is proposed for this analyte every 3 years under this WQMRP.

#### *Sulfate*

Sulfate concentrations are highest in the furthest downgradient wells (MW-19R and MW-20R) immediately adjacent to the San Jacinto River. This area is also characterized by high TDS concentrations. This analyte will continue to be sampled under this WQMRP.

#### *Total Dissolved Solids (TDS)*

TDS concentrations are highest in the furthest downgradient wells (MW-19R and MW-20R) immediately adjacent to the San Jacinto River. This area is also characterized by high chloride and sulfate concentrations. This analyte will continue to be sampled under this WQMRP.

## **4.2 Plume Maps**

As noted earlier, Techalloy has been monitoring groundwater conditions at the site since 1985, including quarterly monitoring since 1989. This monitoring program has created a very large data-set from which to evaluate groundwater conditions. Plume maps from the January 2005 sampling event are included in Appendix B for the following constituents.

- Beryllium
- Cadmium
- Chloride
- Chromium
- Cobalt
- Copper
- Fluoride
- Manganese
- Nickel
- Nitrate
- pH
- Sulfate
- Total dissolved solids (TDS)
- Zinc.



Results of the groundwater investigations and monitoring program show two distinct groundwater plumes associated with the closed ponds (see figures Appendix B). The larger of the two plumes is characterized by the presence of general minerals including sulfate, chlorides, nitrates and total dissolved solids, and extends southward off-site toward the San Jacinto River. The smaller of the two plumes is characterized by low pH and the presence of elevated concentrations of the metals, in addition to the general minerals.

## **5.0 MONITORING PROGRAM DESCRIPTION**

The following section describes the monitoring program to be followed at the Techalloy site. Sampling procedures are contained in the Sampling and Analysis Plan (SAP) provided in Appendix C.

### **5.1 Objectives, Program Type and Exemptions**

The objective of the groundwater monitoring program is to provide data necessary for identifying changes in groundwater conditions (i.e., significant increasing or decreasing concentration or groundwater elevation trends) which would cause a need to re-evaluate the groundwater management strategy. At the Techalloy facility, sufficient data has been generated over the last 20 years to provide a good understanding of the type and extent of contaminants in the groundwater, and to evaluate trends in concentration data.

As chronicled in Section 2.2.2, the environmental programs related to the closed ponds has been completed through the Corrective Measures Implementation program stage. The result of this work culminated in agreement by the U.S. EPA that no further remediation of the groundwater is necessary, and continued monitoring is an appropriate groundwater management strategy. On this basis, the WQMRP is in the Corrective Action Monitoring stage.

The monitoring program was previously exempt from vadose zone and surface water monitoring and statistical evaluation by the DTSC under the former program. Vadose zone monitoring was deemed unnecessary because of the nature of the contaminants and the fact that the source area (the ponds) had been capped. Surface water monitoring was also deemed to be unnecessary due to the overall lack of significant surface water at the facility and the engineered cap over the source area, and therefore the lack of a pathway for impact to surface water. Statistical evaluation was deemed unnecessary since a release to groundwater from the regulated units had already been documented. For these reasons, this WQMRP also does not include provisions for vadose zone monitoring, surface water monitoring, and statistical evaluation.

## **5.2 Monitoring Well Network and Point of Compliance**

The monitoring well network is shown on Figure 5. The network currently includes 25 wells; 19 wells that are used for sampling, and an additional six (6) wells that are used for measurement of water levels only. There are four (4) monitoring well clusters where the upper and lower part of the water-bearing zone is screened: MW-2R and MW-8B, MW-14AR and MW-14B, MW-21A and MW-21B, and MW-25A and MW-25B. Well construction details are provided in Appendix D.

Section 66264.95 of CCR Title 22 defines the point of compliance as "... a vertical surface located at the hydraulically downgradient limit of the waste management area that extends through the uppermost aquifer underlying the regulated unit." For Techalloy, the regulated unit is the closed surface impoundments. Therefore, the monitoring wells immediately downgradient of the closed units (MW-1R, MW-2R, MW-3R, MW-5R and MW-8B) will be used as the point of compliance wells.

## **5.3 Monitoring Parameters, Frequency and Reporting**

Semiannual sampling will be conducted in the first two full weeks in January and July (first and third quarters), providing the wells are accessible. Occasionally, heavy rains in January limits access to the wells since all of the off-site wells are in open dirt fields. In the event wells are inaccessible, sampling will be conducted as soon the wells are reasonably accessible. Water level measurements will be collected in April and October.

One variation to the sampling plan will be the inclusion of several analytes to be sampled only every 3 years. These are analytes identified as potential constituents of concern (see Section 2.2.2), but have not been detected at concentrations that indicate a release from the ponds.

Field activities will consist of the following:

- Collection of water levels from each well
- Purging of the wells and recording field parameters
- Sample collection for laboratory analyses.

Details of the field activities are provided in the SAP (Appendix C).

Table 2 outlines the monitoring and analytical parameters to be conducted during each semiannual sampling event. The list of parameters has been prepared based on thorough review of existing monitoring data as discussed in Section 4.2, and consideration of requirements for sampling for all identified constituents of concern at least every 3 years. This list will provide sufficient information to continue to monitor the constituents of concern and meet the objectives of the monitoring program.

Monitoring reports will be submitted as follows:

- January sampling results and April water level monitoring will be submitted in a single report by the end of May.
- July sampling results and October water level monitoring will be submitted in a single report by the end of November.
- The November report will be an annual report and will include historical results of the data-set to evaluate long-term trends.

The format for the reports will be similar to prior quarterly reports, and will include appropriate tables and figures to present the data.

#### **5.4 Concentration Limits**

Section 66264.94 of CCR Title 22 requires a concentration limit to be established for each constituent of concern in each medium of concern (groundwater only at the Techalloy facility). The concentration limit for each constituent of concern listed in Section 2.2.3 will be the greater of the background value (as determined from upgradient wells MW-21A and -21B) or maximum contaminant level (MCL), as shown on Table 3. These limits may be re-evaluated as provided for under Section 66264.94 to incorporate technological and economic feasibility since the monitoring program is under Corrective Action Monitoring.

#### **5.5 Data Analysis**

In accordance with California Code of Regulations, Title 22, Section 66264.100(d), the owner or operator shall establish and implement a water quality monitoring program to demonstrate the effectiveness of the corrective action groundwater monitoring program. An important element of the monitoring program is data evaluation.

The groundwater in the vicinity is known to be impacted by site activities, however, the US EPA and DTSC has overseen long term groundwater monitoring at the facility and observed stable groundwater conditions. These conditions are such that interwell data evaluation (evaluation of data between wells) generally does not provide useful information regarding the stability of conditions at the site. However, intrawell data evaluation (evaluation of data trends within a given well) can provide useful information regarding potential increasing or decreasing trends within a well.

The trend analysis will consist of two activities: (1) maintaining historical concentration data by well and generating historical concentration plots to evaluate potential trends in concentration results over time, and (2) statistical trend analysis for key indicator compounds in key wells.

Trend analyses for groundwater monitoring data will utilize a non-parametric test for trend described in the USGS document "Statistical Methods in Water Resources" by D.R.

Helsel and R.M. Hirsch (the Mann-Kendall test). The non-parametric tests for trend do not require the underlying data to be normally-distributed. Non-detects will be assigned the value of one half of the practical quantitation limit (PQL). The trend analyses will be run on data generated starting in 1995 to avoid incorporating high detection limit values in the earlier data set.

The historical data tables and plots and the statistical trend analysis will be provided in the annual report submitted in November. Data analysis for the constituent of concern (COC) parameters sampled once every three years will be provided in the November annual report submitted that year.

## **5.6 Monitoring System Operation and Maintenance Plan**

The monitoring system operation and maintenance plan will consist of inspection of the monitoring wells and measurement of well depths during each semiannual sampling event. The wells will be inspected for a variety of conditions to ensure the wells are properly maintained and secured. An example well inspection form is included with other field forms in Appendix C. The well depth will be recorded to monitor for sediment accumulation that may require removal or well redevelopment.

A well will be re-developed to remove accumulated sediment within the well when depth to well bottom measurements show the well has accumulated sediment at greater than 10% of the original total well depth. For most of the shallow wells, this value is around 3 feet of accumulated sediment since most shallow wells are approximately 30 feet deep. Well heads, pads and traffic bollards will be inspected and repaired if well integrity is compromised.